

REMARKS

Claims 1-28 were pending in this application. Claim 23 is cancelled and claim 24 amended to incorporate the limitations of claim 23. This is permitted even after a final rejection. Claims 21 and 25 are amended to correct minor typographical errors, which is also permitted.

Claim 28 should be amended, after withdrawal of finality and claims 29-33 added.

Claims 1-28 were rejected.

Interview Follow-up

Applicants appreciate the phone call from Examiner Chacko Davis on July 16, 2007, during which she advised that they would look at a single provisional to determine its teaching, rather than trying to combine two provisionals to provide support for an early filing date and a § 102(3) rejection. This is consistent with the view urged during our interview and reflected in our interview summary.

Request for Withdrawal of Finality

Applicants request that the finality of the office action mailed May 18, 2007 be withdrawn on the basis that the Examiner shifted from relying on Novak et al. Publication No. 2006/0023182 (Novak), which does not qualify as a reference based on its filing date, to relying on the '033 provisional application as a basis for giving an earlier effective date to small parts of Novak. This is a significant shift to a new reference and new ground of rejection, as the prior office action relied on a 23-page printed application and the final office action relies on a thin provisional consisting of three and one-half typed pages and one sheet of drawings. Finality is inappropriate when a new reference and new analysis are introduced that are not necessitated by any claim amendment. MPEP § 706.07(a).

The analysis required is much different for applying the '033 provisional and was confirmed by the Examiner and her SPE only after consulting with others within the PTO. Consultation confirmed that the position that Applicants took in response to the non-final rejection was correct (Resp. 7-8) and the form of analysis applied by the Examiner in the final rejection (FOA 6) was mistaken. Therefore, finality was premature and should be withdrawn. *Ibid.*

Upon withdrawal of finality, the new claims should be entered, which feature focus air used to control the distance between the objective lens assembly and the workpiece.

Rejection Under 35 U.S.C. § 102(e) of Claims 11-16 and 20-22

The Examiner persisted in rejecting **claims 11-16 and 20-22** under 35 U.S.C. § 102(e) as anticipated by U.S. Application Publication No. 2006/0023182 (Novak publication), even though its filing date does not qualify it as a reference.

In response to Applicant's position (FOA 6), but not in the rejection proper (FOA 2-4), the Examiner argued that the '112 provisional and the '033 provisional justify rejections. However, the Examiner made a limited and unsuccessful effort to trace from passages of the provisional applications to paragraphs of the Novak publication, which is necessary for parts of the Novak publication to benefit from the earlier filing date of the provisionals.

The provisionals were not published and can never qualify as prior art. Instead, they can only be used by the Examiner to give parts of the Novak publication (paragraph by paragraph) an earlier effective filing date, to the extent that a provisional application satisfies the § 112 first paragraph requirements for enablement and written description and passages of the provisional are repeated without revision in the publication. Of course, if the inventor learned something new and updated the disclosure after the provisional, the new combination cannot be afforded an early filing date.

Claim 11

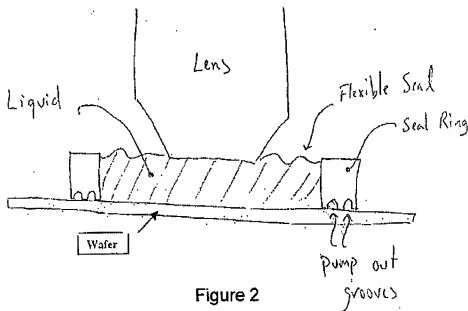
Claim 11 includes the limitations:

An immersion lithographic system for patterning a work piece arranged at an image plane and covered at least partly with a layer sensitive to electromagnetic radiation, comprising

- *a source emitting electromagnetic radiation onto an object plane,*
- *a mask arranged at said object plane to relay said electromagnetic radiation toward said work piece,*
- *an immersion medium contacting at least a portion of an immersion optics of said lithographic system and a portion of said work piece, wherein said immersion medium is supplied through at least one orifice arranged in said immersion optics.*

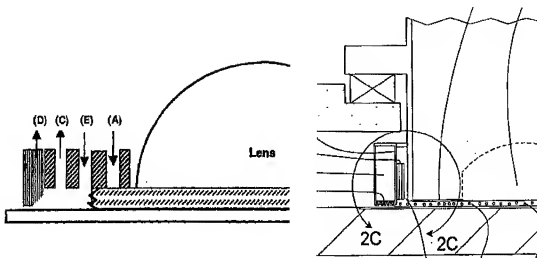
These limitations are not found in Novak.

The '112 provisional cannot support any part of the Novak publication that reads on supplying immersion media through an orifice in the immersion optics because the '112 provisional lacks a written description of supply immersion medium. The provisional makes no mention of how immersion media is supplied. The figures depict multiple "pump out grooves", but no supply. For instance, FIG. 2:



The written description requirement for a supply orifice is not satisfied by the '112 provisional, so it cannot support an early filing date for any part of the Novak publication that illustrates supply.

The '033 provisional does illustrate supply through channel A ('033 p. 2) but does not support Novak FIG. 2B. Numerous differences in channel structure between '033 provisional FIG. 1 and Novak FIG. 2B indicate development and revisions between filing of the provisional and non-provisional applications. These differences appear in a side-by-side comparison, with the provisional on the left:



The non-provisional design involves fewer channels and does not find support in the '033 provisional. Further differences are apparent in the complete figures.

(Although the Novak publication FIG. 2B is not entitled to an early filing date, does not qualify as prior art and cannot be the basis of a § 102(e) rejection, the Examiner might consider relying on published FIGS. 5A/B.)

Therefore, claims 11 and 20-21 should be allowable over the portion of Novak on which the Examiner relies.

Claim 12

Claim 12 includes the limitations:

wherein said source emitting electromagnetic radiation is an excimer laser

These limitations are not found in any part of Novak that is entitled to an early filing date, because neither the '112 nor the '033 provisional mentions lasers or excimer lasers.

Therefore, claim 12 should be allowable over Novak.

Claims 13 and 22

Claims 13 and 22 include the limitations:

further comprising a porous or fibrous material through which said immersion medium is supplied

These limitations are not found in Novak.

The '112 provisional does not describe a supply for immersion medium.

The '033 provisional does not describe using porous or fibrous material through which immersion medium would be supplied. What the '033 provisional says is, "In

Figure 1, the immersion fluid is injected at channel A. It is important that the immersion fluid be bubble free, and possibly de-aerated to remove absorbed gasses." As this is the whole written description regarding supply of immersion media, the Novak publication cannot be entitled to an early filing date for anything that would read on claims 13 or 22.

To anticipate an argument that the Examiner might make, the wick device D of the '033 provisional does not read on these claims. The '033 provisional explains, at 3:22-25, "Some of the immersion fluid may escape the primary vacuum-scavenging device described above and pass under land [sic] C'. This immersion fluid can be removed by a wick device D. This device is high absorbent to the immersion fluid." A wick for absorbing stray fluid does not read on "*porous or fibrous material through which immersion medium is supplied.*"

There is not enough in the '112 or '033 provisional to support an early date for any portion of the Novak publication that would read on these claims.

Therefore, claims 13 and 22 should be allowable over Novak.

Claims 14-16

Claims 14-16 should be allowable over Novak for at least the same reasons as claim 11, from which they depend.

Claims 20-21

Claims 20-21 include the limitations:

[20] *An immersion lithographic system for patterning a work piece arranged at an image plane and covered at least partly with a layer sensitive to electromagnetic radiation, comprising*

- *a source emitting electromagnetic radiation onto an object plane,*
- *a mask, adapted to receive and modulate said electromagnetic radiation at said object plane and to relay said electromagnetic radiation toward said work piece,*
- *an immersion medium contacting at least a portion of a final lens of said lithographic system and a portion of said work piece, wherein **an area of said contacting is restricted by capillary forces***

[21] ...

[from 17] - *an immersion medium contacting at least a portion of a objective lens of said lithographic system and a portion of said work piece, wherein **an area of said contacting is restricted by capillary forces***

further comprising a immersion medium reservoir for supplying immersion medium to said portion of said objective lens and said workpiece

These limitations are not found in Novak.

The notion of the contacting area being restricted by capillary forces is explained in the application, paragraph 0041, "In the embodiment illustrated in figure 2b the immersion medium film is cut at the curved surface 295. At this curved surface the capillary action is gradually reduced, and the immersion medium will stop to expand [sic] when a certain distance between the immersion optics 200 and the work piece 260 is reached. This design efficiently keeps control of the lateral extension of the immersion medium film." This design restricts the reach of capillary forces, in contrast to using vacuum channels and a wick to control the extent of fluid.

The '112 provisional makes no mention of capillary action. It relies on a seal ring and vacuum to draw immersion fluid into the area between the ring and the wafer and then out. A gap of between 0.1 and 2 mm is bounded by a wick material, which draws fluid into the wick to be absorbed. ('112 at 3-4) Vacuum is also relied on to constrain the fluid. (*Id.* at 4) Neither vacuum nor wicks read on these claims.

The '033 provisional teaches using capillary action to **promote** the distribution of fluid, not any way in which it can be used to **restrict** the contacting area. "Capillary action greatly enhances the flow, especially if the fluid gap is relatively small, e.g. 1mm or less." ('033 at 2:27-28) The fluid is restricted by a combination of a primary vacuum-scavenging device and an outer wick. "Some of the immersion fluid may escape the primary vacuum-scavenging device described above and pass under land [sic] C'. This immersion fluid can be removed by a wick device D. This device is high absorbent to the immersion fluid." (*Id.* at 3:22-25). The provisional goes on to explain steps to make the wick effective in increasing small droplets that escape the vacuum-scavenging device. In the '033 provisional, neither the mention of capillary force which expands the flow of immersion media nor the mention of vacuum-scavenging and wicks read on a design that uses capillary forces to **restrict** the contacting area. Therefore, nothing in the Novak publication could be entitled to an early filing date that would qualify it as prior art against these claims.

There is not enough in the '112 or '033 provisional to support an early date for any portion of the Novak publication that would read on these claims.

Claims 20-21 should be allowable over Novak.

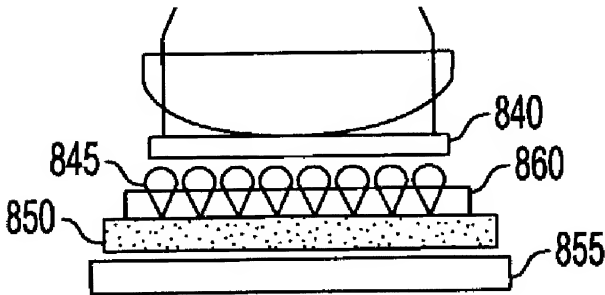
Applicants respectfully submit that claims 11-16 and 20-22 should be allowable over Novak.

Rejection Under 35 U.S.C. § 103(a) of Claims 1-10, 17-19 and 24-27

The Examiner rejects **claims 1-10, 17-19 and 24-27** under 35 U.S.C. § 103(a) as unpatentable over U.S. Application Publication No. 2006/0023182 (Novak et al.) in view of U.S. Application Publication No. 2003/0123040 (Almog).

(Rejection of claims 23 and 28 is moot, as claim 23 is cancelled and claim 28 amended to add a new limitation.)

The Examiner has not described how a combination of a Novak provisional and Almog would work. The massively parallel beam array (Almog 0002) is depicted as having a multi-lens interface at the workpiece, which is not readily combined with anything taught in the Novak provisionals. The parallel beam projection system is depicted in FIG. 8:



We simply do not see how the Examiner proposes to combine Almog and the subject matter disclosed in Novak's provisionals; too little is written for us to understand or imagine the proposed combination. Too little is written to satisfy the Examiner's *prima facie* burden.

Claim 1

Claim 1 includes limitations similar to claim 11 and should be allowable for at least the same reasons. It also should be allowable because no proper combination of references is described.

Claims 2-4

Claims 2-4 include the limitations:

wherein said modulator is an SLM

wherein said SLM comprises reflective pixels

wherein said reflective pixels are micromirrors

These limitations are not found in Novak et al. in view of Almogy.

No proper combination of references is described, for the reasons given above.

Therefore, claims 2-4 should be allowable over Novak et al. in view of Almogy.

Claim 5

Claim 5 includes the limitations:

wherein said modulator is an acoustooptical modulator

These limitations are not found in Novak et al. in view of Almogy.

Almogy 0058-0060 describes a micromirror array, not an acoustooptical modulator. In addition, no proper combination of references is described, for the reasons given above.

Therefore, claim 5 should be allowable over Novak et al. in view of Almogy.

Claim 6

Claim 6 should be allowable over Novak et al. in view of Almogy for at least the same reasons as claim 1, from which it depends.

Claims 7, 19 and 27

Claims 7, 19 and 27 include the limitations:

further comprising a porous or fibrous material through which said immersion medium is supplied

These limitations are not found in Novak et al. in view of Almogy.

These claims should be allowable for at least the same reasons as the claims from which they depend. They should be allowable for at least the same reasons as

claims 13 and 22, which they resemble. They should be allowable because no proper combination of references is described, for the reasons given above.

Therefore, claims 7, 19 and 27 should be allowable over Novak et al. in view of Almogy.

Claims 8-9

Claims 8-9 should be allowable over Novak et al. in view of Almogy for at least the same reasons as claim 1, from which they depend.

Claim 10

Claim 10, which depends from claim 7, includes the limitations:

wherein said porous material is kept incompletely saturated with said immersion medium

These limitations are not found in Novak et al. in view of Almogy.

Again, Novak describes a wick for removing fluid, not a porous material through which immersion medium is supplied.

This claim also should be allowed because no proper combination of references is described.

Claim 17 and 24

Claims 17 and 24 include limitations similar to claims 20-21 and should be allowable for at least the same reasons.

Claim 18

Claim 18 includes the limitations:

further comprising a immersion medium reservoir for supplying immersion medium to said portion of said objective lens and said workpiece

These limitations are not found in Novak et al. in view of Almogy.

There is no written description in the '112 or '033 provisional of the claimed immersion medium reservoir that could support an early date for any portion of the Novak publication that might read on this claim.

In addition, this claim also should be allowed because no proper combination of references is described.

Claims 24-26

Claim 24-26 include the limitations:

[24] *A method for patterning a workpiece arranged at an image plane and*

covered at least partly with a layer sensitive to electromagnetic radiation, including the actions of:

- emitting electromagnetic radiation onto an object plane,*
- modulating said electromagnetic radiation at said object plane in accordance to an input pattern description,*
- relaying said electromagnetic radiation toward said workpiece,*
- supplying an immersion medium to contact at least a portion of an objective lens of said lithographic system and at least a portion of said workpiece,*
- restricting a lateral extension of said contact by capillary forces.***

[25] A method for patterning a workpiece arranged at an image plane and covered at least partly with a layer sensitive to electromagnetic radiation, including the actions of:

- emitting electromagnetic radiation onto an object plane,*
- modulating said electromagnetic radiation at said object plane in accordance to an input pattern description,*
- relaying said electromagnetic radiation toward said workpiece,*
- contacting at least a portion of an objective lens of said lithographic system and at least a portion of said workpiece via an immersion medium, wherein said contacting is **restricted in a lateral direction of said workpiece by capillary forces.***

[26] further including the action of:

- supplying said immersion medium via an immersion medium reservoir.*

These limitations are not found in Novak et al. in view of Almogy.

Claims 24-26 should be allowable over Novak et al. in view of Almogy for at least the same reasons as claims 20-21, which they resemble.

Applicants respectfully submit that claims 1-10, 17-19 and 24-27 should be allowable over Novak et al. in view of Almogy.

Amended Claim 28 and Added Claims 29-33

Claim 28 and the added claims 29-33 share the limitation of a focus air supply, which controls focus of the objective lens by adjusting the distance between the objective lens and the workpiece. This limitation is supported by the application 0033. Some of the claims also add drying air, which is supported by 0034. Applicants do not intend to introduce any new matter by these amendments or additions.

CONCLUSION

Applicants respectfully submit that the pending claims are now in condition for allowance and thereby solicit acceptance of the claims as now stated.

Applicants would welcome an interview, if the Examiner is so inclined. The undersigned can ordinarily be reached at his office at (650) 712-0340 from 8:30 a.m. to 5:30 p.m. PST, Monday through Friday, and can be reached at his cell phone at (415) 902-6112 most other times.

Fee Authorization. The Commissioner is hereby authorized to charge underpayment of any additional fees or credit any overpayment associated with this communication to Deposit Account No. 50-0869 (MLSE 1035-1).

Respectfully submitted,

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